Amendments to the Specification:

Please add the following new paragraph before paragraph **[0001]**:

CROSS REFERENCE

This application claims priority from US Provisional Application Serial No. 60/430,374 filed on December 3, 2002.

Please amend paragraph **[0010]** as follows:

[0010] The minimum cell voltage for one of the cell groups is estimated according to $\left[\left[V_{mi} = \frac{V_g}{M} - \frac{(N-M)*V_{ss}}{M}\right]\right]$ $V_{mi} = \frac{V_g}{M} - \frac{(N-M)*V_{sa}}{M}$ where N is a number of cells in the cell group, and M is an estimated number of cells operating below the average cell stack voltage.

Please amend paragraph **[0011]** as follows:

[0011] In accordance with a second aspect, the present invention provides a voltage monitoring system for monitoring cell voltages for a plurality of electrochemical cells connected in series forming a cell stack. The plurality of electrochemical cells are divided into at least two cell groups. The voltage monitoring system comprises a voltage measuring unit for measuring cell group voltage V_g for each cell group, and cell stack voltage V_s for the cell stack. The voltage monitoring system also comprises a processing means connected to the voltage measuring unit for calculating an average cell stack voltage V_{sa}, estimating a cell group minimum cell voltage V_{mi} for each cell group to obtain a set of minimum cell voltages, and determining a minimum cell voltage V_{min} for the cell stack by finding the minimum value in the set of minimum cell voltages.

Please amend paragraph **[0012]** as follows:

[0012] The processing means estimates the minimum cell voltage for one of the cell groups according to $\left[\left[V_{mi} = \frac{V_g}{M} - \frac{(N-M)*V_{ss}}{M}\right]\right]$ $\underline{V_{mi} = \frac{V_g}{M} - \frac{(N-M)*V_{sa}}{M}}$ where N is a number of cells in the cell group, and M is an estimated number of cells operating below the average cell stack voltage.

Please amend paragraph **[0014]** as follows:

[0014] In accordance with another aspect, the present invention provides a voltage monitoring system for monitoring cell voltages for a plurality of electrochemical cells connected in series forming a cell stack, the plurality of electrochemical cells [[groups]] being divided into at least two cell groups. The voltage monitoring system comprises a voltage measuring unit for measuring a cell group voltage V_g for each cell group, and a cell [[a]] stack voltage V_s for the cell stack. The voltage monitoring system further comprises a processing means connected to the voltage measuring unit for calculating an average cell stack voltage V_{sa}, repeatedly estimating a cell group minimum cell voltage V_{mi} for one of the cell groups and comparing the minimum cell voltage V_{mi} to a threshold value until one of the minimum cell voltages V_{mi} is less than or equal to the threshold value or the minimum cell voltage V_{mi} for each of the cell groups has been estimated.

Please amend paragraph **[0020]** as follows:

[0020] Group cell voltages $\mathbf{V_{gi}}$ are measured across the two ends of each cell group. A stack voltage $\mathbf{V_s}$ is also measured across the whole electrochemical cell stack **10**. The overall stack voltage $\mathbf{V_s}$ is then divided by the total number of cells in the electrochemical cell stack **10** to obtain an average cell stack voltage $\mathbf{V_{sa}}$.

Please amend paragraph **[0021]** as follows:

[0021] Referring now to Figure 2, shown therein is a block diagram illustrating exemplary cell voltages for cell group 2 of Figure 1. It is estimated that within cell group 2, three of the cells, namely cells **14**, **16** and **18** are operating at the average cell stack

voltage [[V_{as}]]$\underline{V_{sa}}$ and one cell, namely cell **20** is operating below the average cell stack voltage [[V_{as}]]$\underline{V_{sa}}$, thereby decreasing the cell group voltage V_{g2}. In this case, the following equation can be can be used to obtain the cell group V_{g2}:

$$V_{g2} = V_{m2} + 3V_{sa} \quad (1)$$

where V_{m2} is the minimum cell voltage in the fuel cell group. Accordingly, the minimum cell voltage V_{m2} can be obtained from the following equation:

$$V_{m2} = V_{g2} - 3V_{sa} \quad (2)$$

Please amend paragraph **[0022]** as follows:

[0022] In reality, there may be any number of cells operating below the average cell stack voltage V_{sa} within a specific fuel cell group. In the present invention, it is assumed each cell operating below the average cell stack voltage operates at the same cell voltage V_{mi}. Therefore, in general–, the cell voltage V_{gi} for a cell group i can be obtained from the following equation:

[[$V_{gi} = M*V_{min} + (N-M)*V_{sa}$]] $\underline{V_{gi} = M*V_{mi} + (N-M)*V_{sa}}$ (3)

where N is the number of cells within the cell group **i** and M is the estimated number of cells operating below the average cell stack voltage V_{sa}. Accordingly, M has a value that is less than or equal to N. Therefore, in general, the minimum cell voltage for the cell group i can be estimated as follows:

$$V_{mi} = \frac{V_{gi}}{M} - \frac{(N-M)*V_{sa}}{M} \quad (4)$$

Please amend paragraph **[0023]** as follows:

[0023] Equation 4 is used to estimate the minimum cell voltage V_{mi} for a cell group i for any number of cells operating below the average cell stack voltage V_{sa} in the cell group i by setting the parameter M equal to the estimated number of cells that are operating under the average cell stack voltage V_{sa}. This estimation is done for each and every cell group within the electrochemical cell stack to obtain a set of minimum cell voltages V_{mi}, from which the minimum value is selected as a minimum cell voltage V_{min} ~~can be found~~ for the entire electrochemical cell stack **10**. In practice, voltage

measurement for each cell group and the entire electrochemical cell stack **10** is performed at a certain interval, for example every 10 ms. The minimum cell voltage [[$V_{m\ i}$]]$\underline{V_{mi}}$ is then estimated and used to determine whether or not the cells are operating at an acceptable condition. In general, the parameter M is a low value such as 1 whereas the number of cells N in a particular cell group is on the order of 4 to 6. However, as the number of cells N in the electrochemical cell stack **10** increases, the parameter M may be also be increased.

Please amend paragraph **[0025]** as follows:

[0025] The fuel cell voltage monitoring system **102** comprises a voltage measuring unit **120** and a processing unit **122**. The voltage measuring unit **120** is connected to the fuel cell stack **104** via a plurality of electrical lines or contacts **124** to measure the voltages across a plurality of cell groups within the fuel cell stack **104**. The voltage measuring unit **120** provides the measured cell group voltages V_{gi} as well as the stack voltage V_s to the processing unit **122**. The processing unit [[**120**]]**122** then calculates the average cell stack voltage V_{sa} and estimates the minimum cell voltage V_{mi} for each cell group and the overall minimum cell voltage V_{min} for the entire fuel cell stack **104** in accordance with the present invention. The voltage measuring unit **120** may comprise a bank of differential amplifiers, or the like, with appropriate pre-processing circuitry for effecting the voltage measurements, as is commonly known to those skilled in the art. The processing unit [[**210**]]**122** may be a controller, or a microprocessor. There may be additional hardware components connected between the voltage measuring unit **120** and the processing unit **122** such as an analog-to-digital converter and a digital-to-analog converter.

Please amend paragraph **[0029]** as follows:

[0029] In an alternative, the minimum cell voltage V_{mi} for each cell group does not need to be estimated for each cell group if any of the estimated minimum cell voltages V_{mi} that are thus far estimated are smaller than the first or second thresholds. For instance, if there are 5 cell groups, and if after estimating the minimum cell voltages for the first two cell groups it is determined that one of the minimum cell voltages V_{mi} is

smaller than the first or second threshold, then there is no need to estimate the remaining minimum cell voltages. A suitable action can be done based on this result. In the example of Figure 3, the processing unit **122** can perform the suitable action of shutting down the fuel cell system **100** or increasing the setting on the compressor [[**102**]]**108** to provide more oxidant, as the particular situation dictates.